Office Memorandum. UNITED STATES GOVERNMENT

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FROM:						
SUBJECT:	RS-	11A/B - Conti	ract XG-1355 and RI)=85, T _• 0 _• 2		
purpo	ge of	General - A monitoring Present wer	the RS-LLAYB & RS-	the ecticut, on 12 11A/B Power sy	July 1956 for stem developme	· tne
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of the state of th	were ne RS secon e tra visit	shipping what shipping what shipping was an arranged mass specific was specific	n dea	lephone inquire t would be ava time of this v the fact that to shut down f	ies indicated ilable along wisit to the co	that nth ntractor. vo cessive
harm Rece rece Ther deem bein in t	onic iver iver e are led de	deficiencies sensitivity, e also under esirable in to cope of the w, and is not	include method of output impedance, consideration seve	frequency dia and receiver ral minor desi ent, but these since they rep for is already	raw noise figuration raw noise figuration improvement amenda matters are represent an increase the present an increase one year behing work should be	n, ure. ts not rease nd
	•		Delivery - The Cor	tractor deliv	ered two each	RT-11A

3. Equipment Delivery - The contractor delivered transmitters and one each RT-11B transmitter. The contractor feels that these three modified transmitters represent final prototype samples. They will be evaluated by the Laboratory. The transmitters have additional TVI circuitry incorporated. The silver keying contacts have been replaced by vanadium-tungsten contacts. The key click suppressor-condenser across the key has been raised from .Ol mfd to .1 mfd. The attached schematic shows the new TVI circuitry in red.



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4. Equipment non-delivery - The initial RR-2B receiver is currently being evaluated by the Laboratory. Immediately prior to departing for Connecticut, the Laboratory advised that receiver sensitivity varied from 8 to 40 microvolts over the range of 12 to 30 megacycles. The contractor was of the opinion that an equipment defect had was so advised. developed since the equipment had been shipped. The second RR-2B prototype sample was not available for delivery as promised. The contractor had been advised earlier that the Government was interested in the delivery of prototype samples such as represented acceptable prototype equipment in the opinion of the contractor. At the time of this visit, the company was engaged in frequency calibration measurements of the RR-11B receiver after exposure to minus 40 degree temperatures. It was indicated that frequency drift at this temperature was in the neighborhood of 20 kilocycles. It was also implied that additional difficulties were encountered with control malfunctioning at minus 40 degrees.

5. Receiver output impedance - The contractor's engineering aggressiveness has been affected by the company's two changes in management and engineering $_{25 imes1}$ personnel. The problems of output impedance encountered by herewith described in some detail to illustrate as a case in point, the character of engineering progressiveness. The equipment spcifications require that the output impedance be 4000 ohms when measured with a signal modulated at 1000 cycles. The initial design of the output stage of the RS-11 receiver consisted of a IAD5 as a voltage amplifier with an output impedance of 700,000 ohms and a current drain of .9 milliamps. drawings indicate that the primary of the output transformer has an impedance of 30,000 ohms, and the secondary, 4000 ohms. However, the contractor erroneously made impedance measurements with a signal modulated at 400 cycles. The output impedance, when measured at 1000 cycles, looks like 12000 ohms. Government recommended that the contractor consider the substitution of a 1AG4 as the power output tube. This tube has an impedance of 180,000 chms and a load of 1200 ohms. The current of 2.4 ma. Thus impedance matching to a 4000 load could be optimized with a transformer of proper turns ratio and current carrying capability. subsequently modified the equipment for the IAG4, but did not provide a new transformer. The present transformer saturates with the 2.4 ma D.C. through the windings. The company then reverted back to the IAD4 voltage amplifier and placed a 4000 ohm resistor across the secondary. The Government does not feel that placing a resistor across the secondary of the transformer is an acceptable engineering practice. The contractor is presently awaiting delivery of a new transformer replacement, since all printed board dimensions are based on the use of this miniaturized transformer, and perhaps feels, along with the Government, that a major redesign might be necessary in order to accommodate an output transformer having optimum characteristics. The need for a bias voltage was discussed, and it was pointed out, as advised earlier, that the BA-1315/U battery no longer has the A- terminal of the battery grounded or brought to the case exterior. The contractor was also invited to consider the utilization of a bleeder network to provide the necessary bias voltage.





- 6. RD-85, Task Order 2 RS-11 Power System -

b. The AC power supply has been breadboarded. Full wave bridge rectification is accomplished with 4 200 ma silicon diodes. The contractor's attention was invited to a requirement for reasonably high internal impedance in the AC power supply in order to limit the current of the unbiased power amplifier in the RS-11 transmitter.

An inquiry was made into progress made in initiating a subcontract for the hand crank generator development. is soliciting a bid from the Hampshire, and upon its receipt plans to ask for authorization of the contracting officer to sub-contract in an amount of approximately \$5,000. The present sub-contract limit under the terms of RD-85 is \$1,000. It had been suggested earlier contact for hand crank generator sub-contractual work because of good recommendations to this Office by ; but as yet advised that they had contacted had no reply. It was suggested that a follow-up letter be prepared since there is some possibility that would not be interested in small quantity production.

- 7. Task 3 RD-85 is in receipt of task 3 of the RD-85 which requires the modification of the RS-11A to cover 4 to 16 mc/s. Four prototypes are to be provided with nomenclature as RS-11C. The task requires delivery 90 days after approval of the RS-11A/B prototype samples.
- 8. Additional design refinements The laboratory is investigating the feasability of placing a noise supressing network in the audio stage of the receiver. A microampere, meter movement has been developed by Weston for the A.F. which has a face diameter of 3/4". If the barrell length can be housed in the RT-llA/B case it is planned that this meter with diode rectifier and multipliers replace the present incandescent lamp tuning indicator for increased equipment reliability when operating into a low impedance antenna.



CONTRACTOR

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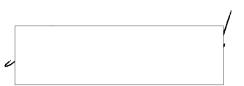
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The present low 70 ohm antenna impedance needs to be adjusted downward to accommodate shorter antennas approaching a quarter wave length at the operating frequency. (When the random length of antenna happens to approach a quarter wave length of the operating frequency the current may be as high as 500 ma. At lower frequencies the random length antenna does not approach the quarter wave length and a 70 ohm impedance is reasonable).

is well aware that certain design deficiencies in the RS-11A/B equipment exist and that comprehensive redesign may be necessary (in the case of the receiver). The government suggested, but has not demanded a comprehensive redesign under the fixed fee contract because the design difficulties can be traced to the deficiencies of the battery about which the equipment was to be designed. These deficiencies are notical least recognized in the case of the reduced capacity and remedied, in the case of bias voltage provisions. It is recommended that be given until mid-August to deliver an acceptable prototype sample receiver.



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